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Inpatient Care for Severe Trauma in Rhode Island

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In late 2001 and 2002, the Rhode Island Department of Health performed a structured review of the state's trauma system under a grant from the Health Resources and Services Administration, the federal agency that supports the development of emergency medical services (EMS) at the local level.[1] Currently, the Department is working with an advisory group consisting of medical care providers, public health officials, and others in the state to develop a trauma systems plan that will identify high-priority activities to improve the delivery of trauma care. As one step in the development of the plan, the advisory committee requested that the American College of Surgeons (ACS) perform a trauma systems consult in Rhode Island, bringing national experts into the evaluation and planning process.

As one aspect of the preparation for the ACS consult, a subgroup of the advisory committee requested and reviewed data from a number of sources reflecting the current status of trauma care in the state. In particular, the data on patterns of inpatient care for severe trauma that were produced were summarized for the ACS consultants in a presentation on the first day of their visit in February 2004. The data presented here are excerpted from hat presentation to the ACS consultation committee.

Methods. All acute-care general hospitals in Rhode Island submit patient-level data for every hospital inpatient stay, as required by licensure regulations. Up to eleven diagnoses made during the hospital admission are included as codes from the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM).[2] For this analysis, trauma discharges were defined as any patient discharged with a principal diagnosis of injury. The severity of each patient's injuries were approximated by the Injury Severity Score (ISS) derived from injury diagnosis codes.[3] Trauma discharges were categorized as severe if their ISS was 16 or higher; discharges for which a trauma score could not be generated were excluded from the analysis. The analysis covered hospitalizations during the period 1998-2002.

Results. During the five-year period investigated, there were 24,254 discharges with a principal diagnosis of injury, an average of 4,850 per year. Of these, 2,517 (10.4%) were identified as severe (ISS of 16 or higher), an average of 503 per year. These trauma patients were treated in ten of the state's acute-care general hospitals, not including Women and Infants Hospital of Rhode Island. Of these ten hospitals, one, Rhode Island Hospital, is designated as a Level I Trauma Center, the highest level of designation provided by the American College of Surgeons. The other nine have no trauma center designation from ACS. The distribution of trauma patients among these hospitals differs according to the severity of the trauma sustained. For the most severe trauma cases, more than four out of five (82.5%) were treated at the Level I Trauma Center. (Figure 1) For the less severe trauma (ISS = 1 – 15), only 41.6% were treated there; the majority were treated at the other acute-care general hospitals.

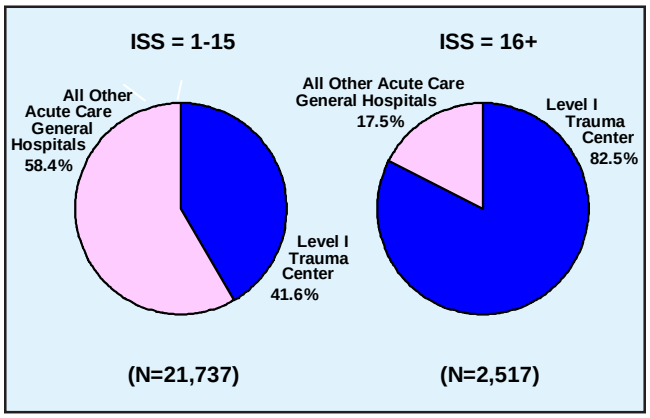

Figure 1. *Hospital discharges with principal diagnosis of trauma, by ISS group and type of hospital, Rhode Island, 1998-2002.*

Over the five years examined, the proportion of the severe trauma cases treated at the state's only trauma center has risen. (Figure 2) In 1998, the proportion was just under 79%; it rose in every subsequent year except 2000, surpassing 85% in 2002.

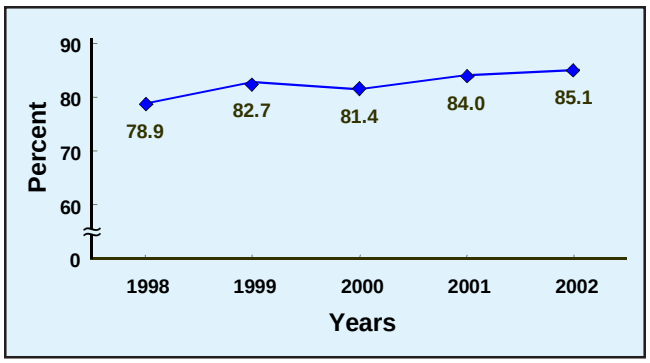

Figure 2. *Hospital discharges with principal diagnosis of trauma and ISS ≥16: proportion treated at the Level I Trauma Center, by year, Rhode Island, 1998-2002.*

Within the group of patients with severe trauma, the more severely injured were more likely to be treated at the

trauma center than those with less severe injuries. For the large group with severity scores at the low end of severe range (1,539 cases, or 61.1% of the total), 78.8% were treated at the trauma center. (Figure 3) At the other end of the scale, all of the 88 cases (3.5% of the total) with severity scores of 35 or greater were treated at the trauma center. The relationship between severity and place of treatment also held at intermediate levels of severity.

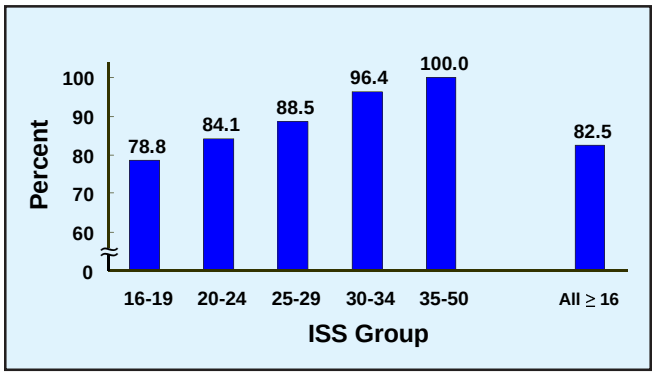

Figure 3. *Hospital discharges with principal diagnosis of trauma and ISS ≥ 16: proportion treated at the Level I Trauma Center, by ISS group, Rhode Island, 1998-2002.*

Treatment outcomes differ according to the severity of the trauma sustained. Overall, the in-hospital case-fatality rate among patients with severe trauma during 1998-2002 was 11.1%, Among those cases within this group with severity scores below 25, case fatality rates were 6% or lower. (Figure 4) For cases with ISS of 25 or greater, the case fatality rate was much greater, at least 25% for all ISS groups.

Discussion. This analysis of data on hospital inpatients treated for trauma provides a snapshot of how that segment of the trauma care system is currently performing. Some of the patterns presented here and/or to the ACS consultation committee suggest that there are aspects of the trauma care system in Rhode Island that are functioning well. For other results, comparison to benchmarks from fully developed trauma systems in other states may help in evaluating performance. It should be noted that these results are for hospital inpatient care only; the analysis of care provided by emergency medical services and in hospital emergency departments will require data beyond what is currently available for these providers.

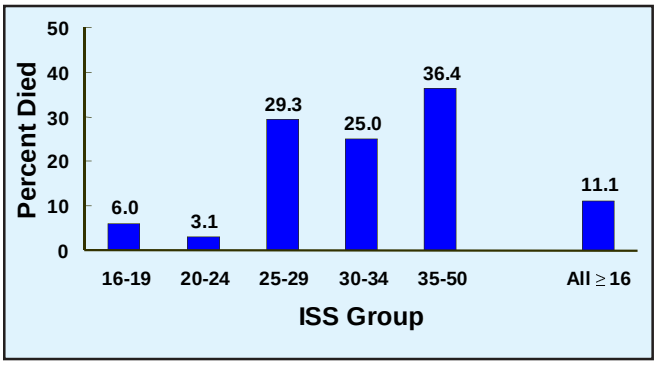

Figure 4. *In-hospital case fatality rate for hospital discharges with principal diagnosis of trauma and ISS ≥ 16, by ISS group, Rhode Island, 1998-2002.*

In their remarks at the end of the consultation, the ACS committee placed a higher priority on the development of a strong quality improvement process focusing on the provision of trauma care than they did on the development of the structural aspects of a system through regulation, licensure, and protocols. It is clear that any such quality improvement process will include a medial peer review committee that will examine the care provided individual patients as they pass through the system. It is also useful to examine the quality of performance of the overall system through statistics such as have been presented here for hospital inpatient care. The two will provide complementary views of system quality and opportunities for the improvement of trauma care in Rhode Island.

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References

1. Zimmerman HE, Buechner JS, Leary P. Planning for Trauma Care in Rhode Island. *Med & Health/RI* 2002; 85:224-5.
2. Public Health Service and Health Care Financing Administration. *International Classification of Diseases, 9th Revision, Clinical Modification, 6th ed.* Washington: Public Health Service, 1996.
3. MacKenzie EJ, Steinwachs DM, Shankar B. Classifying trauma severity based on hospital discharge diagnoses. Validation of an ICD-9CM to AIS-85 conversion table. *Med Care* 1989;27:412-22.

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